AF/2834

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

Yoshihito ASAO, et al.

Appln. No.: 09/813,348

Confirmation No.: 3466

Filed: March 21, 2001

Docket No: Q63175

Group Art Unit: 2834

Examiner: Julio C. Gonzalez

#17 Appeal Brief
J Robinson
12/13/02

For: ELECTRICAL POWER SUPPLY SYSTEM FOR A VEHICLE

SUBMISSION OF APPELLANT'S BRIEF ON APPEAL

Commissioner for Patents
Washington, D.C. 20231

Sir:

Submitted herewith please find an original and two copies of Appellant's Brief on Appeal. A check for the statutory fee of $320.00 is attached. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

Respectfully submitted,

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Date: December 11, 2002

Attorney Docket No.: Q63175

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APPELLANTS' BRIEF ON APPEAL UNDER 37 C.F.R. § 1.192

Commissioner for Patents
Washington, D.C. 20231

Sir:

This is an Appeal from the final rejection of May 14, 2002 (Paper No. 24) of claims 1-10 in Application No. 09/813,348. In accordance with the provisions of 37 C.F.R. § 1.192, Appellant submits the following:

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Mitsubishi Denki Kabushiki Kaisha. Assignment of the application was submitted to the U.S. Patent and Trademark Office on June 26, 2001, and recorded on the same date at Reel 011929, Frame 0751.

II. RELATED APPEALS AND INTERFERENCES

There are no known appeals or interferences that will affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-10 are pending in the application. As set forth in the Final Office Action dated June 11, 2002, claims 5, 6 and 10 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 1, 3 and 7-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaneyuki (USP 5,418,401) in view of Glennon (USP 5,930,134). Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaneyuki in view of Glennon and Taniguchi et al. (USP 5,719,484, hereafter "Taniguchi '484"). Claims 4-6 and 10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaneyuki in view of Glennon and Taniguchi et al. (USP 5,726,559, hereafter "Taniguchi '559"). All of the rejected claims are set forth in the attached Appendix.

IV. STATUS OF AMENDMENTS

In the Amendment filed August 14, 2002, Appellant amended dependent claims 5 and 6 in order to improve clarity and overcome the § 112, second paragraph, rejection. In the Advisory Action dated August 28, 2002, the Examiner indicated that the Amendment filed August 28, 2002 will not be entered because the amendments "are not deemed to place the application in

better form for appeal by materially reducing or simplifying the issues for appeal." Appellant subsequently resubmitted the amendments to claims 5 and 6 in an Amendment filed October 11, 2002, wherein Appellant noted that the claim amendments should be entered because the claim amendments do place the application in better form for appeal by materially reducing or simplifying the issues for appeal since the amendments to claims 5 and 6 by leaving the prior art rejections as the only issue on appeal. In the Advisory Action dated October 23, 2002, the Examiner again refused to enter the claim amendments indicating that "they raise new issues that would require further consideration and/or search."

V. SUMMARY OF THE INVENTION

The present invention is directed to a vehicle electrical power supply system for supplying power from an alternator to a conventional load, such as a battery, and a high power load, such as a blower motor or windshield heater, by increasing the alternator output (page 1, lines 6-10). In a first embodiment of the present invention shown in Figure 1, the power supply system comprises an alternator 1 including an armature assembly 2 having a armature winding for generating three-phase AC power and a three-phase full wave rectifier for rectifying the three-phase AC power generated by the armature winding, a field coil 3 for providing magnetic flux to the armature winding of the armature assembly 2, and a regulator 4 for controlling a field current of the field coil 3. (page 7, lines 6-11). A power relay 8 switches power supplied from

the alternator 1 to a battery 5 (for charging) or a high power load 7. (page 7, lines 21-23).

A control unit 9 detects an on/off state of a switch 10 for charging or the high power load 7 and switches the power relay 8 to the battery 5 based on the detected state of the switch 10. (page 7, lines 23-26). The control unit 9 also controls the regulator 4, whereby an output voltage of the alternator 1 is switched to a low charging voltage for charging the battery 5 or a high voltage for powering the high power load 7. (page 7, line 26 - page 8, line 1). That is, the regulator 4 operates as a voltage controller for controlling a field current of the field coil 3 in order to change the output voltage of the alternator 1. (page 7, lines 11-13). A stepping-up DC/DC converter 6 is provided for stepping up a voltage of the battery 5 and supplying the stepped-up voltage to the field coil 3. (page 7, lines 14-18). In particular, the stepping-up DC/DC converter 6 steps up the battery voltage by a factor of 1.2 to 2.0 in order to increase the field voltage of the field coil 3, and thereby increase a maximum output power of the alternator 1 so that the high power load 7 is capable of being operated. (page 9, lines 6-11).

VI. ISSUES

Whether claims 1 and 8 were erroneously rejected 35 U.S.C. § 103(a) as being unpatentable over Kaneyuki and Glennon?

VII. GROUPING OF CLAIMS

Appellant submits that claims 1-10 stand and fall together. Reasons for patentability are set forth below.

VIII. ARGUMENTS

As a preliminary matter, Appellant notes that dependent claims 5, 6 and 10 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. As discussed above, Appellant has twice submitted amendments to dependent claims 5 and 6 and arguments in traversal of the § 112, second paragraph, rejection of dependent claim 10. However, the Examiner has refused entry of the amendments to claims 5 and 6 and has not responded to the arguments in traversal of the § 112, second paragraph, rejection of claim 10. Although Appellant believes that the amendments to claims 5 and 6 should have been entered and the arguments regarding claim 10 should have been considered as they are believed to overcome the § 112, second paragraph, rejection thereby reducing the issues for appeal, Appellant notes that the § 112, second paragraph, rejection has no bearing on Appellant's arguments for patentability over the prior art of record with regards to independent claims 1 and 8.

Independent claims 1 and 8 each recite, in part, an alternator having an armature winding and a field coil for supplying a power to both a high power load and a battery, a stepping-up DC/DC converter for stepping up a voltage of said battery and applying a stepped-up voltage to

said field coil, a voltage control means for controlling an output voltage of said alternator by controlling a current of said field coil.

As the Examiner correctly notes, Kaneyuki does not teach or suggest a stepping-up DC/DC converter for stepping up a voltage of a battery and applying a stepped-up voltage to a field coil of an alternator. (page 4 of Office Action dated May 14, 2002). Rather, as shown in Figure 1, Kaneyuki discloses that the battery 12 is directly connected to the field coil 3. However, the Examiner asserts that "Glennon discloses for the purpose of improving the reliability of prime movers that it is well known in the art of prime movers to step-up DC/DC converter and apply the voltage to the field coils (column 1, lines 25-29 & figures 1, 3)." (page 4 of Office Action dated May 14, 2002). With regards to independent claims 1 and 8, Appellant respectfully submits that it is quite clear that Glennon does not teach or suggest a stepping-up DC/DC converter for stepping up a voltage of the battery and applying a stepped-up voltage to the *field coil* of the alternator, as claimed.

Glennon discloses a starting system for a prime mover coupled to a generator, wherein a step-up inverter and a pulse-population inverter convert DC power of a first voltage into halfwave pulses of AC power at a second, higher voltage which is applied to the generator in order to operate the generator as a motor to supply motive starting power to the prime mover. (Abstract). As shown in Figure 1 of Glennon, a power conversion system 10 which converts between motive and electrical power includes a prime mover in the form of an aircraft auxiliary power unit (APU) 12, which is coupled to a generator 14. The generator 14 is coupled by a set

of feeders 16 and a set of line contactors 18 to one or more electrical loads. A start converter 24 is responsive to a start command as well as a generator speed signal developed on a line 25 to convert DC power supplied by a battery 26 into AC power which is supplied to the generator 14 via the feeders 16 during operation in a starting mode to cause the generator 14 to operate as a motor and supply motive starting power to the APU 12. After the generator 14 has brought the APU 12 up to self-sufficient speed the APU 12 drives the generator 14 to supply power via the feeders 16 and the line contactors 18 to the loads. (column 3, lines 8-49 of Glennon).

The generator 14 includes a rotor having a main field winding 48 and an exciter armature winding for exciting the main field winding 48 through a three-phase rectifier of an exciter portion 42. The generator 14 also includes a stator having a set of three-phase armature windings 54 which outputs AC power to line contactors 18 via feeders 16. (Glennon: Figure 2; column 3, line 50 - column 4, line 11).

The start converter 24 includes a first step-up inverter 60, a second inverter 62 coupled to the first step-up converter 60. In a starting mode, the armature winding 54 is supplied with stepped-up DC power from the battery 26 via the start converter 24. In particular, the first step-up inverter 60 converts DC power from the battery 26 into a first alternating waveform having a higher voltage. The second inverter 62 converts the first alternating waveform into a second alternating waveform comprising a series of pulses selected from the first alternating waveform and provides the second alternating waveform to the armature winding 54 of the generator 14

such that the generator 14 is operated as a motor to supply motive starting power to the auxiliary power unit 12. (Glennon: Figure 3, column 4, line 12 - column 5, line 5).

Thus, Glennon teaches stepping up a voltage of the battery and applying the stepped-up voltage to the armature winding (54) of the electrical generator (e.g., see claim 1 of Glennon) rather than applying the stepped-up voltage to the field winding or coil (48), as required by the claims.

Similarly, Appellant respectfully submits that Taniguchi '484 and Taniguchi '559 (cited in rejecting dependent claims 2, 4-6 and 10) do not teach or suggest a stepping-up DC/DC converter for stepping up a voltage of the battery and applying a stepped-up voltage to the field coil, as recited in independent claims 1 and 8.

In view of the foregoing, Appellant respectfully submits that independent claims 1 and 8, as well as dependent claims 2-7, 9 and 10, should be allowable because the applied references, alone or combined, do not teach or suggest all of the features of the claims. Therefore, reconsideration and reversal of the Examiner's position to the contrary is respectfully requested.

The present Brief on Appeal is being filed in triplicate. Unless a check is submitted herewith for the fee required under 37 C.F.R. §1.192(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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APPENDIX

CLAIMS 1-10 ON APPEAL:

1. (Amended) An electrical power supply system for an automotive vehicle comprising:

an alternator having an armature winding and a field coil for supplying a power to both a high power load and a battery,

a stepping-up DC/DC converter for stepping up a voltage of said battery and applying a stepped-up voltage to said field coil,

a voltage control means for controlling an output voltage of said alternator by controlling a current of said field coil, and

a control means for increasing power of said alternator by changing said output voltage of said alternator in response to a rotating speed of said alternator when said alternator supplies power to said high power load ,and for controlling said output voltage of said alternator to a battery charging voltage by regulating said voltage control means when said alternator supplies power to said battery.

2. The electrical power supply system for the automotive vehicle according to claim 1, wherein a voltage applied to said field coil is stepped up to a voltage of the battery multiplied by a factor of 1.2 to 2.0.

3. (Amended) The electrical power supply system for the automotive vehicle according to claim 1, wherein said output voltage of said alternator which changes in response to said rotating speed is set to be higher than said voltage of said battery.

4. The electrical power supply system for the automotive vehicle according to claim l, wherein said output voltage of said alternator changes in response to said rotating speed detected by a rotating speed detector.

5. (Amended) The electrical power supply system for the automotive vehicle according to claim l, wherein said voltage control means controls said field current of said alternator based on a detected temperature of said field coil

6. (Amended) The electrical power supply system for the automotive vehicle according to claim l, wherein said voltage control means controls said field current of said alternator based on an inferred temperature from said field current of said alternator.

7. The electrical power supply system for the automotive vehicle according to claim l, wherein said stepping-up DC/DC converter for applying said stepped up voltage of said battery to said field coil is integrated with said voltage control means.

8. (Amended) An electrical power supply system for an automotive vehicle comprising:

an alternator having an armature winding and a field coil for supplying a power to both a high power load and a battery,

a stepping-up DC/DC converter for stepping up a voltage of said battery and applying a stepped-up voltage to said field coil,

a voltage control means for controlling an output voltage of said alternator by controlling a current of said field coil, and for increasing an output of said alternator by changing said output voltage in response to a rotating speed of said alternator in a predetermined rotating speed zone, and

a stepping-down DC/DC converter to step down said output voltage of said alternator to a charging voltage for said battery, and to supply power with a regulated voltage to both said battery and said high power load.

9. The electrical power supply system for the automotive vehicle according to claim 8, wherein said stepping down DC/DC converter for supplying said power to both said high power load and said battery is integrated with said voltage control means.

10. (Amended) The electrical power supply system for the automotive vehicle according to claim 8, wherein an output voltage of said stepping-down DC/DC converter has negative gradient temperature characteristics for suppressing a temperature rise of said alternator.